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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/618,062	07/11/2003	John R. Stowell	PD-02W150	4327

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PATENT DOCKET ADMINISTRATION
RAYTHEON SYSTEMS COMPANY
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EXAMINER

PARRIES, DRUM

ART UNIT	PAPER NUMBER
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2836

DATE MAILED: 07/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/618,062	STOWELL ET AL.	
	Examiner	Art Unit	
	Dru M. Parries	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 12-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 12-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed June 20, 2006 have been fully considered but they are not persuasive. Regarding claim 1, Jiang teaches steering circuitry, which couples switching elements of the first side stage ($S_{20\&21}$) to switching elements of the second side converter stages ($S_{22\&23}$ and $S_{24\&25}$) via primary transformer windings ($TP_{20\&21}$), respectively. The steering circuitry allows current to flow from the first side switching elements to the second side switching elements via primary transformer winding. Giannopoulos teaches steering diodes near the inputs of all of the output channels (520, 540, 560) (equivalent to Jiang's second side converters) for inhibiting current from flowing between output channels (i.e. Jiang's second side converters and switching elements). Therefore, it would have been obvious to place steering diodes to the left of all primary windings of Jiang's second side converters ($TP_{20\&21}$), to inhibit stray currents from flowing into other second side converters and switching elements, at any time. All of the above constitutes the steering circuitry. Claim 1, includes no limitations about a primary side and a secondary side.

Regarding claims 3, 12 and 20-21, based on how the input side of the second side converter stages (56, 58) includes primary windings ($TP_{20\&21}$) of each second side stage transformer, switching elements of the second side converter stages ($S_{22\&23}$ and $S_{24\&25}$), and Giannopoulos' steering diodes, it's inherent that the steering circuitry is coupled to the input side of the second side converter stages ($TP_{20\&21}$), as well as the switching elements of the second side converter stages ($S_{22\&23}$ and $S_{24\&25}$). Also, Jiang is the main reference, and only the idea of

Giannopoulos' steering diodes to inhibit stray currents from flowing between "output circuits" is being used to modify Jiang's invention.

Regarding claims 7, 12 and 21, after the modification of placing Giannopoulos' steering diodes at the input side of the primary winding of each second side converter stage, Jiang's invention contains N steering diodes for each of the N second side converter stages. Also, at no time (i.e. when 3rd switch is on and 5th switch is off OR when 5th switch is on and the 3rd switch is off) will current flow from the first to the second second side converter stage and vice versa.

2. In response to applicant's argument regarding claims 8 and 14 that Jiang and Giannopoulos don't teach freewheeling diodes coupling the input side of each of the transformers to switching elements of the first side stage to allow inductive leakage current to flow from the transformers when an associated switching element is turned off, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. The modification of Giannopoulos' steering diodes into Jiang's invention is structurally equivalent to the claimed freewheeling diodes coupled between the first side stage switching elements and the input of the transformer and therefore is capable of performing the intended use.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-10, 12-18, and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang (EP 0907237) and Giannopoulos (6,504,267). Jiang teaches a power converter with a shared first-side stage (54) to receive an input (Vin). He also teaches a plurality of second-side converter stages (56&60, 58&62, etc.), which split the current flowing from the first-side stage, to generate an output (Vo1, Vo2, etc.). He goes on to teach control circuitry (i.e. signal generator, driver circuits) for monitoring the outputs, and controlling the switches to regulate the output voltage (Col. 2, lines 49-58; Col. 3, lines 1-10). Jiang teaches the second-side converter stages comprising a transformer (TP & TS) and a set of switching elements (S22&23, S24&25) that are alternatively switched on and off to regulate the output. Jiang teaches the first-side stage switches having a duty cycle of 50% and the second-side stage switches are each PWM within the 50% duty cycle of the first-side switches. Jiang teaches the first-side stage comprising first and second switching elements (S20&S21), a first second-side stage comprising third and fourth switches (S22&S23), and a second second-side stage comprising fifth and sixth switches (S24&S25), all which are alternatively switched on and off via PWM controller. The first, third, and fifth switching elements are switched on at substantially the same time, and the third and fifth switches will be switched off before the first (Fig. 3). Jiang also teaches the use of freewheeling diodes (Col. 3, lines 16-21). Jiang fails to teach steering circuitry for inhibiting current flow between second side converter stages. Giannopoulos teaches steering diodes (D1, D2, D3) for inhibiting current from flowing between output circuits (520, 540, 560; equivalent to Jiang's second side converter stages) at any time. It also inhibits current from flowing from or to a transformer (516). It would have been obvious to one of ordinary skill in the art at the time of

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the invention to incorporate steering diodes into Jiang's invention so that stray currents don't flow into other second-side stage converters and interfere with the regulation of their outputs. Jiang also doesn't explicitly teach the converter being a boost or buck converter. The Examiner takes Official notice that there are such elements as buck and/or boost converters. It would have been obvious to one of ordinary skill in the art at the time of the invention to use Jiang's converter as a buck or boost converter, so that systems when a lower voltage is needed can use this invention, and same as if when a higher voltage is needed.

5. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang (EP 0907237) and Giannopoulos (6,504,267) as applied to claims 12, 16, and 17 above, and further in view of Harding et al. (2002/0037796). Jiang and Giannopoulos teach a converter as described above. Jiang fails to explicitly teach an optical coupler to isolate the control circuitry from the driver circuitry. Harding teaches an optical coupler to isolate the control circuitry from any device external to the controller ([0025], lines 3-5). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate an optical coupler into Jiang's invention to isolate the controller from driver circuitry and excess noise.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dru M. Parries whose telephone number is (571) 272-8542. The examiner can normally be reached on M-Th from 8:00am to 5:00pm. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus, can be reached on 571-272-2800 x36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DMP

7-20-2006



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